



# Yale's Greenhouse Gas Reduction Strategy

...creating a sustainable future



# Yale's Greenhouse Gas Reduction Strategy 2005–2020

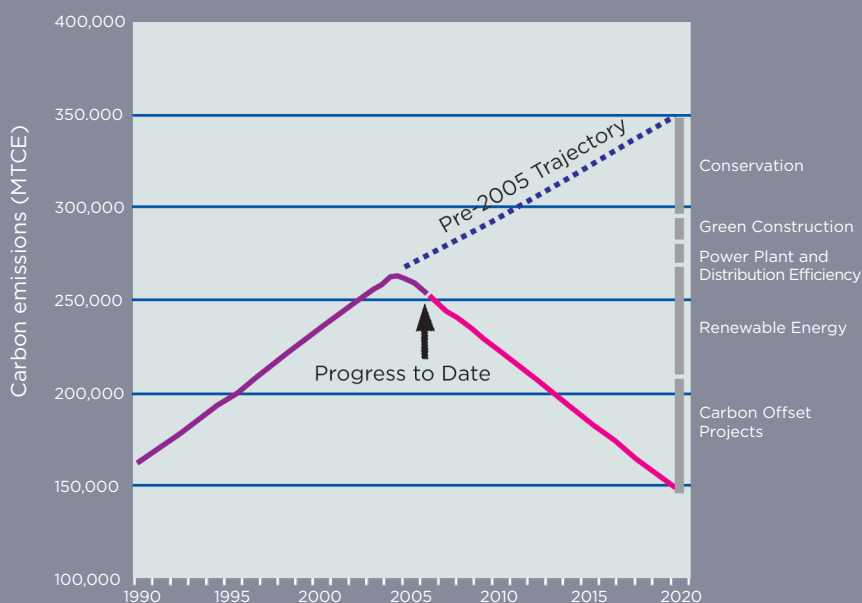
...creating a sustainable future

Yale University has a long tradition of leadership in the consequential societal issues facing each generation. In keeping with this tradition, Yale University has challenged itself to aggressively respond to perhaps the most challenging issue facing our world today: global warming. We hope that by openly sharing our efforts, including our goal, strategies and results, Yale's actions will lead to similar commitments to greenhouse gas reductions by other institutions of higher learning.

In October 2005, Yale committed to the goal of reducing greenhouse gas emissions to **10% below 1990 levels by the year 2020**.<sup>(1)</sup> To meet this goal, Yale will need to reduce its 2005 greenhouse gas emissions by 43%. At the same time Yale will expand from the current 13.5M gross square foot campus by nearly 15% by 2020. The challenge facing our University is the same as the challenge facing the industrialized world: to drastically reduce emissions while also planning for future growth and development.

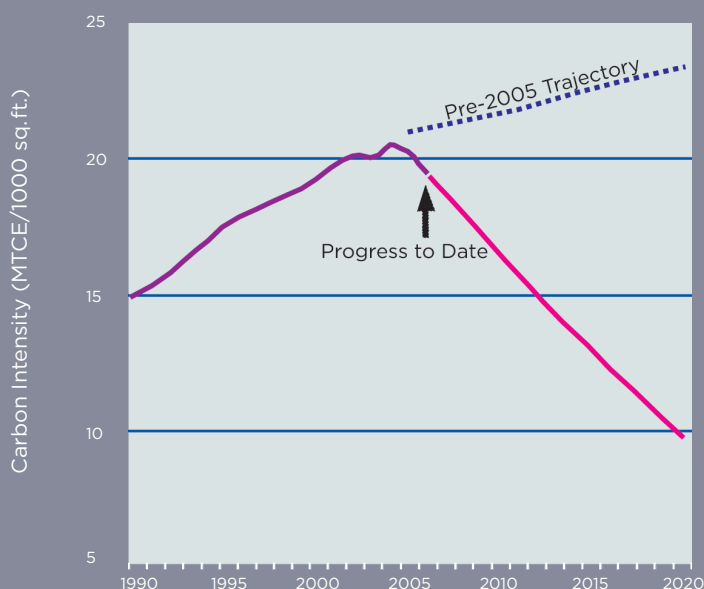
(1) This is consistent with the "Climate Change Action Plan adopted by the New England Governor's and Eastern Canadian Premiers". By comparison, the Kyoto Protocol prescribes a reduction to 7% below 1990 levels by 2012.

## Emissions Reduction Strategy



In 2020, by meeting its greenhouse gas reduction goal, Yale will have reduced its projected "business-as-usual" emissions by over 200,000 metric tons of carbon equivalent.

## Carbon Emissions Intensity



In 2020, if Yale's emissions goal is met, campus greenhouse gas emissions on a per square foot basis will be less than half of Yale's 2004 emissions.

# Greenhouse Gas Reduction Strategy

Yale's priority is to achieve greenhouse gas reductions via implementing initiatives on its campus and owned land, with the balance of planned reductions being achieved via partnering with outside entities. Currently it appears that as much as half of all reductions will be achieved on Yale's campus and land. As new, cleaner technologies emerge in this expanding industry, this percentage may significantly increase.

Alternative energy projects requiring significant capital investment by the University are evaluated on the basis of "resulting carbon reduction per dollar of interest and amortization incurred." Projects yielding the largest return are undertaken first so that emission reductions can be achieved as quickly as possible.

The net impact of this greenhouse gas reduction program is to reduce Yale's annual per square foot greenhouse gas emission from its high in 2004 by nearly 55% in 2020. The program is ambitious and it impacts all parts of Yale's campus. Meeting our goal will require the active participation of all of Yale's community, faculty, students, and staff. Current information regarding Yale's progress can be found at [www.yale.edu/sustainability](http://www.yale.edu/sustainability).

Yale's current plan is to achieve greenhouse gas reductions in the following ways:

STRATEGY	GOAL	TO DATE
Conservation within existing buildings	(55,000) MTCE	(13,823) MTCE
Sustainable construction of new buildings	(9,000) MTCE	
More efficient on campus production & distribution of energy	(9,000) MTCE	(1,134) MTCE
Renewable energy	(65,000) MTCE	(529) MTCE
Direct participation in off-campus carbon offset projects	(65,000) MTCE	
Total Reduction by 2020	(203,000) MTCE	(15,486) MTCE
Projected 2020 GHG Emissions if no action taken	350,000 MTCE	
GHG Emissions in 2020	147,000 MTCE	

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(2) MTCE = "Metric Tons of Carbon Equivalent", the international standard of measure of greenhouse gas emissions.

# Progress To Date

STRATEGY	IMPLEMENTED AND IN PROGRESS	IN DESIGN
<b>Conservation &amp; Community Engagement</b>	<ul style="list-style-type: none"> <li>Reduced air change rate in labs</li> <li>Recommissioned HVAC systems in 90 buildings</li> <li>Occupancy sensors tied to lighting in all residential college common spaces and at 85 buildings</li> <li>Programmable thermostats at all "small buildings" not tied to central control system.</li> <li>Window replacement at Calhoun College &amp; Strathcona</li> <li>Campus-wide set-point adjustments</li> <li>A 10% reduction in energy use in the residential colleges was rewarded with the purchase of 10,000 mWh of renewable energy certificates offsetting 2/3 of their electrical energy use</li> <li>2000 compact fluorescent bulbs distributed to undergraduate students in the residential colleges</li> <li>More than 2000 students signed an Yale Energy Pledge to reduce energy use</li> </ul>	<ul style="list-style-type: none"> <li>Heat recovery systems at all lab buildings</li> <li>Students are preparing to reduce energy use by another 5% in the FY'07</li> <li>2000 additional compact fluorescent bulbs will be distributed to students in the residential colleges</li> <li>A new program is being developed to target residents in graduate student housing</li> </ul>
<b>Sustainable Design &amp; Construction</b>	<ul style="list-style-type: none"> <li>Three LEED certified buildings meeting energy standards 30% below ASHRAE 90.1</li> </ul>	<ul style="list-style-type: none"> <li>Eleven buildings [new construction and renovation] are candidates for LEED design and certification encompassing approximately 1.5 million square feet</li> </ul>
<b>Campus Energy Production &amp; Distribution</b>	<ul style="list-style-type: none"> <li>Increased efficiency of chilled water flow via elimination of previously undetected construction</li> <li>Reduction in winter chilled water production</li> <li>Consolidation of electrical loads optimizing transformer utilization</li> </ul>	<ul style="list-style-type: none"> <li>Installation of 14.2 MW cogeneration plant at SPP, the Medical Center power plant</li> </ul>
<b>Renewable Energy &amp; Alternative Fuels</b>	<ul style="list-style-type: none"> <li>250 kW fuel cell</li> <li>42 kW photo voltaic installation of Divinity School</li> <li>Yale Shuttle Fleet running on an ultra low sulfur diesel and 20% biodiesel blend [80,000 gallons]</li> </ul>	<ul style="list-style-type: none"> <li>Researching opportunities to integrate hybrid and other clean fuel vehicles into the campus fleet</li> </ul>

*Yale University operates two power plants, the Central Power Plant, a cogeneration facility that can supply 18 megawatts of electricity, 340,000 pounds per hour of steam and 14,600 tons of chilled water to the Central and Science Campuses; and, the Sterling Power Plant, a thermal energy facility that can supply 350,000 pounds per hour of steam and 19,900 tons of chilled water to the Yale School of Medicine and the Yale-New Haven Hospital.*



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